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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/634,424

08/05/2003

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200205843-6

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11/02/2005

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EXAMINER

NGUYEN, LAM S

ART UNIT

PAPER NUMBER

2853

DATE MAILED: 11/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.



## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-3, 10-14, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. (US 5053789) in view of Sueoka et al. (US 6024439).

#### **Referring to claims 1, 23:**

Fujii et al. discloses a printhead assembly comprising:

a plurality of printing elements (*FIG. 2, element H*), each of the printing elements configured to cause forming image when the printing element is activated; and  
a plurality of junction photosensors (*FIG. 2, element D*), each junction photosensor coupled to one of the printing elements (*FIG. 2, element H*), each junction photosensor configured to generate an activation signal that causes the printing element coupled to the photosensor to be activated when the photosensor is illuminated by a light source (*FIG. 1, element I*).

Fujii et al. does not disclose wherein the printing elements are ejection elements, such as thermal inkjet elements or piezoelectric inkjet element (**Referring to claims 10-11**), configured to cause fluid to be ejected when the ejection elements are activated, and wherein the plurality of ejection elements are organized into four page-wide-arrays of ejection elements (**Referring to claim 12**).

Sueoka et al. discloses a printing system having a page-wide array printhead including four page-wide-array of ejection elements (*FIG. 10, elements 10Y, 10C, 10B, 10M*), wherein each array having a plurality of ejection printing elements such as thermal/heating elements (*Abstract*) or piezoelectric elements (*column 9, lines 11-15*) for causing ink to be ejected through a plurality of nozzles chambers when the ejection elements are activated to form image on a printing medium.

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to replace the printhead assembly that provides thermal for forming image on a head-response medium as disclosed by Fujii et al. by an inkjet printhead that ejects ink on a printing medium to form images as disclosed by Sueoka et al. The motivation for doing so would have been to obtain the advantages of an inkjet printing printhead such as low noise and capability of high speed printing as taught by Sueoka et al. (*column 1, lines 19-22*).

Fujii et al. also discloses the following claimed invention:

**Referring to claim 2:** wherein the photosensors are photodiodes (*FIG. 2, element D*).

**Referring to claim 3:** wherein the photosensors are phototransistors (*FIG. 2: The combination of a diode D and the associated transistor Tr*).

**Referring to claim 13:** wherein the printhead assembly is a page-wide-array printhead assembly (*FIG. 1, element 3*).

**Referring to claim 14:** wherein each photosensor coupled to one of the ejection elements is positioned substantially adjacent to the ejection element that it is coupled to (*FIG. 1, elements 3a-b*).

2. Claims 1, 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maru et al. (US 5877784) in view of Fujii et al. (US 5053789).

Mura et al. discloses a printhead assembly (*FIG. 11*) comprising:

a plurality of ejection elements (*FIG. 11, element 101*), each of the ejection elements configured to cause fluid to be ejected when the ejection element is activated;

a shift register (*FIG. 11, element 105*) for receiving image data wiring transferred from an external device; and

a plurality of amplifiers (*FIG. 11, elements 102, 104*), wherein image data transferred to the ejection elements via one of the amplifiers.

Mura et al. does not discloses a plurality of photosensors for receiving image data, each photosensor is coupled to one of the ejection elements and configured to generate an activation signal that causes the ejection element coupled to the photosensor to be activated when the photosensor is illuminated by a light source.

Fujii et al. discloses a printhead assembly comprising a plurality of printing elements (*FIG. 2, element H*), each of the printing elements configured to cause forming image when the printing element is activated, and a plurality of junction photosensors (*FIG. 2, element D*) for receiving optical image data, each junction photosensor coupled to one of the printing elements (*FIG. 2, element H*) and configured to generate an activation signal that causes the printing element coupled to the photosensor to be activated when the photosensor is illuminated by a light source (*FIG. 1, element 1*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to replace the wiring image data transfer system in the printer disclosed by

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Maru et al. by the optical image data transfer such as replacing the shift register by the array of photosensors for receiving optical image data and including a light source and an illumination system for generating the optical image data as disclosed by Fujii et al. The motivation for doing so would have been to eliminate the wiring connection between the printhead assembly and the external device, as a well known common technique in the art to avoid many problems due to wiring connection, such as wiring short circuit and wiring disconnection.

3. Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maru et al. (US 5877784) in view of Fujii et al. (US 5053789), as applied to claim 4, and further in view of Millman et al. (Microelectronics, Second Edition, McGraw-Hill, Inc, 1987).

Maru et al., as modified, discloses the claimed invention as discussed above and also discloses wherein each amplifier comprises first and second bipolar junction transistors (BJT) (*FIG. 11, element 102*), a latch (*FIG. 11, element 104*) being coupled to the gate/base of the first transistor of the amplifier, and wherein the second transistor of each amplifier is coupled to the first transistor of the amplifier and to one of the ejection elements (*FIG. 11, element 101*), the second transistor of each amplifier configured to provide a drive signal for activating the ejection element coupled to the second transistor when the first transistor of the amplifier is turned on (*FIG. 11*).

However, Maru et al., as modified, does not disclose wherein the transistors are field effect transistors (FET), each including a gate, a source, and a drain.

Millman et al. teaches that an important feature of field-effect transistors, each including a gate, a source, and a drain (*page 135, fourth paragraph and FIG. 4-3*), is that it is often simpler

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to fabricate and occupies less than space on a chip than does a BJT in order to increase component density in a very large scale integration (*page 133, second paragraph*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the amplifier disclosed by Mura et al., as modified, to use the field-effect transistors rather than bipolar junction transistors (BJT) as disclosed by Millman et al. The motivation for doing so because it is simpler to fabricate and occupies less than space on a chip, so it is able to increase component density to build a very large scale integration as taught by Millman et al. (*page 133, second paragraph*).

4. Claims 1-3, 9, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura et al. (US 4794463) in view of Fujii et al. (US 5053789).

Tamura et al. discloses a printhead assembly (*FIG. 1*) comprising:

a plurality of ejection elements (*FIG. 2, element 19a or 19b*), each of the ejection elements configured to cause fluid to be ejected when the ejection element is activated, and

a plurality of photosensors (*FIG. 2, element 15: Photoconductive*), each photosensor coupled to one of the ejection elements (*FIG. 2, element 19a or 19b*), each photosensor configured to generate an activation signal that causes the ejection element coupled to the photosensor to be activated when the photosensor is illuminated by a light source (*FIG. 2: When the photoconductive 15 is illuminated by the light source 5, a signal is generated in element 19b through element 14a*).

Tamura et al. does not disclose wherein the photosensors are in junction type such as photodiodes or phototransistors (**Referring to claims 1-3, 23**).

Fujii et al. discloses a printhead assembly comprising a plurality of printing elements (*FIG. 2, element H*), each of the printing elements configured to cause forming image when the printing element is activated, and a plurality of junction photosensors, such as photodiodes or phototransistors (*FIG. 2: Diode D, or the combination of diode D and the associated transistor Tr*) for receiving optical image data, each junction photosensor coupled to one of the printing elements (*FIG. 2, element H*) and configured to generate an activation signal that causes the printing element coupled to the photosensor to be activated when the photosensor is illuminated by a light source (*FIG. 1, element I*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to replace the photoconductive disclosed by Tamura et al. by the photodiode or phototransistor as disclosed by Fujii et al. since they are equivalent and exchangeable devices that, well known in the art, are used for converting an optical energy to an electrical signal.

Tamura et al. also discloses the following claimed invention:

**Referring to claim 9:** wherein the plurality of printhead fluid ejection elements is formed on a glass substrate (*column 19, line 64 to column 20, line 13*).

### ***Response to Arguments***

Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

### ***Contact Information***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S. NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D. MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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